THE ANTIQUARIAN.

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THE MONTEZUMA CASTLE REPAIR EXPEDITION.

Arizona abounds in wonders, stupendous enough in grandeur to satisfy the most exacting investigator. The imaginative embellishments of the pseudo-scientist, the romancer, and the much-traveled book writer can be dispensed with. Commercially and socially Arizona is a part of the United States, but in many other respects it is very dissimilar. Here mountain and valley desert and fertile field lie in such close proximities as to present a varied and pleasing contrast. Here the old and the new join hands over a long period of unwritten history. The agriculturist of today grows his products, in many instances on sites of former villages and cities that have been for hundreds of years the home and hiding place of wild beasts and venomous reptiles.

These varied features are perhaps not more markably presented in any like area on this continent, as they are in that section known as the Verde valley and along the tributaries of the Rio Verde in Arizona. In picturesqueness of scenery this valley has few, if any, superiors in any country outside of the Grand Canon of the Colorado. In addition to the natural beauties presented this section is still, but to a less extent than formerly, one of the richest fields for archaeological research on the continent. There is but little left for the curio hunter, but for the earnest student, the real investigation, the cliff cavate, and the pueblo ruins, will present a field well worth his time and study. Fortunately for real students, the vandals could not carry these away, though they have despoiled them more or less in their search for something—anything that would bring a price from the curio dealer or collector.

It has been my good fortune to visit this favored section several times and to study, to a limited extent, some of the prehistoric ruins. The last of these visits was made on the nineteenth of May, 1897. In company with Mr. J. A. Rokahl we left Prescott early on the morning of the nineteenth and drove through over mountain roads fifty miles in one day, to Montezuma castle, our point of destination. The object of this visit was to repair the damage done this magnificent monument of antiquity by time and vandals. The repair and preservation of this fine old ruin was suggested by Mr. Frank C. Reid, of Flagstaff, Ariz., Vice-President of the Arizona Antiquarian Association and an enthusiastic and energetic student of archaeology.

The general formation of the country embraced in these observations is sedimentary, cut by numerous deep, narrow canons, the walls of which present many caves and rat holes turned on their side, affording suitable places for primitive man to effect a lodgment and make for himself and family a home after the fashion of his day. The builders of Montezuma castle selected for their home one of the most commodious of

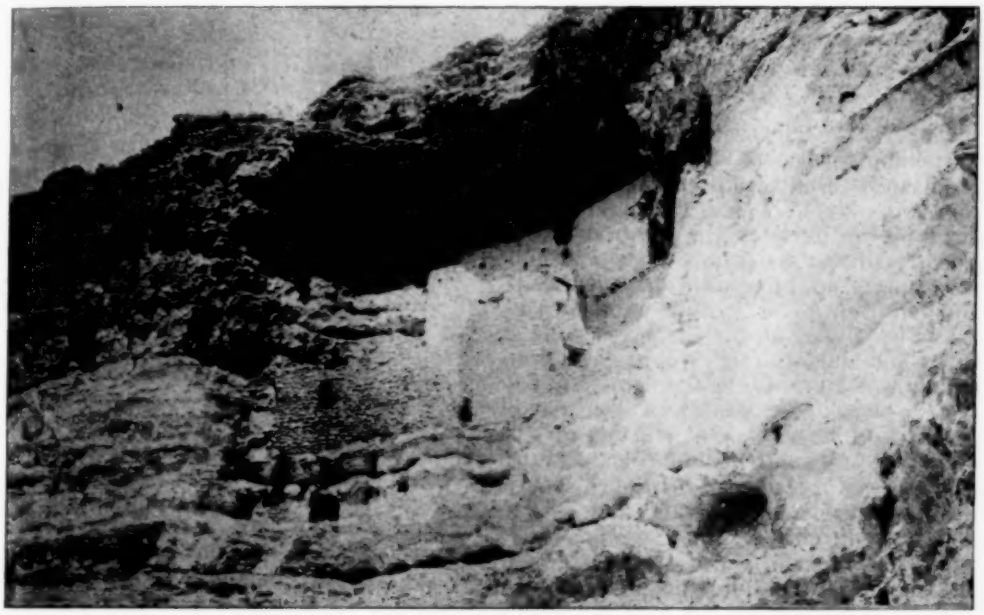
these caves on the west bank of Beaver creek, situated about three and a half miles above its confluence with the Rio Verde. The cliff in which Montezuma castle is situated is about a quarter of a mile in length and about two hundred feet high above the creek bed. The castle is not the only ruin in this cliff, but the largest now standing, about four hundred feet below the castle there remains evidence of another extensive ruin long since fallen; other ruins of smaller dimensions than the one to be described still remain in a good state of preservation and from the valley below look like swallow nests built high up in the cliffs.

Montezuma castle, so called for lack of a better name, is truly a castle in proportions. It contains twenty large and eight small rooms besides a number of closets and alcoves evidently used for store rooms. What the original dimensions of this building were is purely conjectural as a portion of it has already fallen and now forms a part of the talus at the base of the cliff.

I have not noticed in any of the published accounts of this ruin any measurment indicating its height or dimensions. In order to obtain accurate data, I used a tape line for that purpose and found that from the ledge of rock upon which the base of the castle rested to the intersection of the talus was fifty-five feet. If a level were run from the creek to an intersection of the perpendicular cliff, it would approximate one hundred feet to base of castle. The castle measures forty-eight feet from base to summit, being five stories in height.

The tower shown in the right center of the illustration was originally much higher than at present and about twelve feet square and at the time of our visit was in a tottering condition and very unsafe for workmen or visitors, much of the foundation especially at the right hand corner had given way, due to the excavations of curio hunters. The walls of this building were all constructed of stone and mortar, made of the native cement. Time has amply demonstrated the character of the work and workmen. It is the general impression that the cliff dwellers were an ignorant, savage people, the records left in this and many other such structures do not warrant such an opinion. Whatever their condition or plans in the scale of civilization, they knew how to build a house that would stand. In the outer rooms a sufficient number of openings were left for light and ventilation. The floors perhaps are the most curious of any part of the structure. Great logs, twelve to fifteen inches in diameter, were used as joists for the second, third and fourth floors. These run from the outer wall to the cliff, some of them are laid on ledges suitable for anchorage, and there made fast with stones and natural cement, the outer end being made fast in the wall. These logs are placed every six or eight feet. Then another set of logs three or four inches thick are laid across these. Then comes a layer of willow twigs six or eight feet in length, every three or four of these twigs are bound together with yucca fiber, tied with a square knot and at equal distance so that the ties are in a perfect line from one side of the room to the other. On the top of this comes a layer of bamboo, pieces of which are long enough to reach across the room. On top of this is a layer of cedar bark, and the whole is covered with about two inches of adobe with a thin layer of cement. In these floors we find the raised portion for sleeping purposes exactly like the pueblos build today.

This description is applicable to all cliff houses of more than one story. Accessibility to material and environment may and doubtless does modify construction. When we consider that all this timber was cut with a stone ax and together with the stone and mortar was elevated more than



Montezuma Castle, Arizona.

fifty feet, along a perpendicular cliff wall, we may form some idea of the immense amount of labor required to successfully construct such a building in such an uncanny and inaccessible place.

The upper story is without a roof, the overhanging rock answering that purpose admirably. The walls are built up to within about three feet of the roof of the cave, so that neither wind, rain nor sunshine ever reaches this part of the building.

Throughout the entire building one will find objects that give an air of freshness, such as finger marks in the mortar, the new look about the cut surface of the wood, the floors, etc., that makes one feel almost acquainted with the builders of this wonderful place, and that it had not been long uninhabited by human beings. Then when we consider the great accumulation of debris, droppings from birds, rats, bats, etc., to the extent of two and a half to three feet in depth all over the floor, we realize that it must have been ages, centuries perhaps, in accumulating.

In some published account of this ruin it is stated that the building is of adobe and the timbers used are all of red cedar. These are very erroneous and misleading statements. The building is, as before stated, made of stone and mortar and the timbers grew along Beaver creek. They are ash, sycamore, h ckberry and the like. There is very little cedar in the building and that is white cedar, as there is no red cedar in this part of Arizona, if, indeed, there is any in any part of it.

Owing to the failure of the nineteenth legislative assembly to appropriate money for the repair and preservation of our antiquities, the Arizona Antiquarian Association took this matter in hand and raised, by subscription from members and others, a sufficient fund to repair this ruin. The work of repair is much easier described than performed. Over 3000 pounds of material were used, natural country stone, iron rods, some of them over twenty feet in length and an inch thick, were used to an-

chor the structure to the cliff, corrugated iron covers all the outer exposed rooms replacing the original roof, which had fallen. Breaks in the walls and niches that had fallen out were replaced.

The approaches are all of first class material and workmanship and securely anchored to the cliffs, so that all danger of falling from this giddy height is entirely abolished. Suitable stairs have been built and put in place, affording easy and safe ascent and descent from one story to another. The debris has nearly all been removed so that ladies and children can enjoy a day's outing with pleasure, safety and comfort. All this work has been done with the idea to restore and preserve what remains of this famous old ruin with as little change of appearance as possible. There are many questions that students would like to and do ask about the builders of this cliff house and for the benefit of those who have not and may never have an opportunity of seeing this ruin, I would say that very little is known, and what knowledge we do possess has been obtained by comparative study of living races. As a result of this prolonged, laborious and unsatisfactory course, it may be stated that the cliff dwellers were the ancestors of the present pueblo, or village people of the southwest. That the cliff house period preceded the cavate house and the cavate preceded the village building on the mesa. These periodical changes were not abrupt or well-defined, but were subject to the laws of evolution, one gradually emerging into another. Some are very old, others comparatively modern. Of the age of Montezuma castle nothing is known and any opinion on that point would be purely conjectural. It is conceded, however, by all competent archaeologists who have examined the ruins in this section, that this castle is one of the oldest and that this valley was probably uninhabited in 1540, when Coronado, the Spanish desperado and robber, made his famous expedition through the southwest in search of the seven cities of Cibola that he might conquer their inhabitants and carry away their reputed wealth.

DR. J. MILLER,
President Arizona Antiquarian Association.

PROCEEDINGS OF SECTION H,

(Anthropology.)

Detroit Meeting, August 9th-14th, 1897, of the American Association for the Advancement of Science.

I can truly say that of all the meetings of the Association which I have attended, this one has been productive of the most information. I have talked with many members and they all agree that the session of Section H was more interesting and presented a better series of papers than had been read at any previous meeting.

Of the greatest importance was the discussion of the Trenton gravels and sands in which implements of supposed glacial antiquity were found. I shall not treat of the other papers at length, only mentioning a few of them. I do this because of lack of space. Every paper read was of interest and importance, and I regret that I can not speak of each one specifically.

The sectional committee (of which I had the honor to be a member), arranged the program somewhat differently from that of former meetings. Tuesday afternoon we had papers upon Folk Lore. Wednesday morning we read upon Mexico and Central America; Wednesday afternoon the Trenton discussion in which the geologists joined, having adjourned their Section in order to hold joint session with us. Thursday morning papers were read upon United States archaeology, and Thursday afternoon we treated of general anthropology. Friday morning and afternoon we presented the sociology papers and others which had been left over from previous sessions.

Of the meetings aside from Wednesday afternoon, the papers by Dr. Anita Newcomb McGee on Koreshanity, a Latter-day Cult; Surveys of Ancient Cities in Mexico, by Professor W. H. Holmes; The Import of the Totem—a Study of the Omaha Tribe, by Miss Alice C. Fletcher, received special attention. They, along with nearly all the other papers, will be published in full in "Science" and in pamphlet form.

In 1893 at Madison, Wis., we had somewhat of a discussion of Palaeolithic Man, which waxed very warm. Thursday a joint debate, participated in by the "giants," both in geology and anthropol-

ogy, was free from any personality, was conducted in the most satisfactory and gentlemanly manner possible and resulted in a clear and definite understanding on the part of everyone present as to the exact evidence for and against the proposition that finds at Trenton indicated the presence of glacial man.

Although for four hours some three hundred persons listened to these papers and the ensuing discussion, only the most respectful and absorbing attention was given to the speakers. Everyone seemed to realize that it was the most thorough presentation of the case ever offered, and on that very afternoon we were to reach a definite conclusion concerning a problem which has been a thorn in the side of all scientists.

I herewith append the entire program presented Wednesday afternoon. I will say in explanation that the discussion followed the reading of the last paper. As the papers are to be published, I will simply treat of the discussion itself.

Early Man of the Delaware Valley. By Prof. F. W. Putnam.

On the Implement Bearing Sand Deposits at Trenton, N. J. By G. N. Knapp.

Implement Bearing Sand Deposits at Trenton, N. J. By H. B. Kummel.

Discussion of the Relics from the Sand Deposits on the Lalor farm. By Prof. G. F. Wright.

Archaeological Researches in the Trenton Gravels. By Prof. W. H. Holmes.

Report of an Examination of the Trenches Dug on the Lalor Farm, July 25-29. By Henry C. Mercer.

Investigation in the Land Deposits of the Lalor Field. By Prof. Thomas Wilson.

Geologic Age of the Relic-Bearing Deposits at Trenton, N. J. By Prof. R. D. Salisbury.

Professor Putnam opened the discussion by referring to the work done by Mr. Volk, who has been laboring for ten years under his direction on the Trenton field. He spoke of the results of Mr. Volk's work, of the great trenches which he had dug. He exhibited charts and diagrams relative to the Lalor Farm finds. He said that it rested with the geologists to settle the age of sand deposits in which argillite objects were found. He himself thought them to be very ancient, if not glacial. Professor Wright read a long paper accompanied by diagrams and specimens. He controverted the statement of Messrs. Knapp and Kummel that the sand was deposited by wind. There were too many pebbles of large size. He concluded that the sand layers were deposited at the end of the last glacial period by water.

Many of the speakers during this session spoke without notes. Professor Holmes, however, read a paper illustrated by the best and simplest and most convincing diagrams which I ever saw. The paper was clear-cut, to the point, and we all agreed that it was the masterpiece of the entire discussion. It was so written that without losing any of its dignity or strength, the youngest and most unexperienced person present could readily comprehend. It not only summed up the results of his past explorations, but also presented a number of new and striking facts. For myself, I could not see how that Messrs. Wright and Putnam could satisfactorily explain the finding of no implements in the great sewer trench. Holmes' assistants spent five weeks in and about this sewer and were unable to find a single implement in it. Professor Holmes thought that the finds were not indicative of glacial man, but that an argillite workshop had been covered by sand through wind agencies.

Professor Salisbury argued from a geologist's standpoint, concluding that the deposits were not of glacial origin. Professor Chamberlain said that the question had narrowed down to a discussion of sand layers three to four feet thick. There need be no argument relative to the gravel layers themselves. That had been settled, he said, and the evidence (Holmes' observations on the long, deep sewer trench) was against implements having been found in them. He said that this thin sand deposit could hardly be considered to furnish evidence of glacial man.

Professor Putnam, in final remarks, felt repaid for his twenty years' work at Trenton. He stated that two men did find two implements in gravel and that seven or eight were found in the railroad cut in what he believes to have been glacial gravel. Having found one implement himself back of a large boulder, he says that almost any geologist would consider it glacial. (At this statement Geologist Gilbert shakes his head.) Prof. Putnam spoke of a human skull having been found thirteen feet deep. Professor Salisbury (replying) said that he considered the position of Professor Holmes as the correct one. As to the implement behind the boulder, its presence may be accounted for by one of Professor Holmes' suggestion (the roots, burrowing animals, etc.); a geologist would not say it was glacial. He used the term "most assuredly not."

Professor Holmes said that, as it is, we have no significance or foundation whatever for the statement that there is a difference of a marked degree between the implements found in the upper and lower strata. It is hardly probable that the original observers knew that the disturbed gravel in the talus slopes often extend to the depth of twenty feet or more. He objects to the term "argillite culture," used by Professor Wright and says that such a term being employed, conveys a wrong interpretation. Chairman McGee, in closing the discussion, well said that fifteen years ago nearly all archaeologists regarded the evidence as conclusively proving the existence of glacial man, but since the observations of the competent gentlemen present have been given to the Section, he thinks that every member will agree with him in the proposition that so far, at least, as the facts presented are concerned, they prove that we have not conclusively substantiated the existence of glacial man in America. That no man would welcome such a discovery more than himself, but that until further facts are obtained, he must agree with the preponderance of testimony that the question is settled in the negative.

As a final suggestion I might say that after following this discussion extremely carefully, I can not see other than that Messrs. Holmes, Salisbury, Chamberlain, Gilbert, Cushing, and one or two others have the better of the argument. I have seldom listened—and I have attended a great many scientific meetings—to more logical, concise, accurate and to the point arguments than were presented by the gentlemen I have named.

All of them spoke in terms of compliment regarding Professor Putnam's extended and thorough investigation of the Trenton district. All of them said they would welcome the advent of glacial man whenever his presence was conclusively proved. But the geologists were of the opinion that the sand was not only not glacial, but of no great antiquity, and that these remains should be found not in a bluff along the river, regarding which there would arise an argument, but in a plain country, or in glacial till, or in gravel formation removed from a valley, so that none of these uncertainties should be considered. Until implements were found under such conditions regarding which there could be no dispute, the question must be considered to have been settled in the negative.

Finally, I can not see how any fair-minded man, familiar with either geologic or archaeologic conditions, could take exception to the conclusions deduced by these several and thoroughly competent authorities.

WARREN K. MOOREHEAD.

Detroit, August 13.

THE METHOD OF MAKING STONE ARROW-POINTS.

My first opportunity for observing the survival of the "Stone Age" on this continent was early in the summer of 1850, when, a grown boy, I was in the great caravan of emigrants en route overland to California. At the headwaters of the Humboldt river, some men of the party I then happened to be traveling with started out one morning about daylight in search of horses stolen by Indians during the night. Following the trail to the hills, one of the men left the others and entered a narrow ravine to which he thought the tracks led; but had hardly gone out of sight when his companions heard him call for help. Hastening to his assistance, they found him lying on the rocks, dangerously wounded in the breast by an arrow. Improvising a stretcher, they placed him on it and brought him back to camp; when, on examination, it was seen that he had been shot with an arrow having an obsidian point, that had pierced the left edge of the sternum a little below the attachment of the clavicle. This ready weapon of volcanic glass penetrated the chest and broke, leaving the glistening fragment, two inches in length and nearly an inch in width, imbedded in the bone. A surgeon in the company extracted it with much difficulty, but not with the success that crowned Cabeca de Vaca's similar operation on the Pueblo Indian in 1536; for our man died of internal hemorrhage.

One day in the following September, when camped at the head of Dark Canyon, several miles east of Georgetown, El Dorado county, California, I had gone hunting, and, lured by the novel fauna and flora and grand scenery of that wild region, I wandered some distance into the depth of the great mountain forest, when thirst impelled me to go down one of the numerous ravines for water. While sitting there resting the impressive solitude was suddenly disturbed by a jack rabbit swiftly passing by me and soon disappearing up the opposite slope.

As the graceful little animal leaped across the rivulet a few feet above me an arrow whizzed by, but falling short of its intended victim, struck the ground with the force of a bullet. Looking around, I was startled at seeing an Indian coming down the hill, with bow in hand, entirely naked, and repulsive in appearance as a wild beast. I grasped my gun to repel an attack, but saw at a glance that he was, like myself, a hunter and not a warrior. Slung over his shoulder was a fine quiver, made of the entire skin of a mountain, or cavit, cat (Bassaris) Astuta), with the animal's head intact at the lower end, and its tail hanging from the top. In the quiver were two beautiful feathered arrows which, I afterward saw, had glistening stone points. Without even a grunt of salutation or apology for his airy dishabille, he stopped at the water's edge and, lying flat on the rocks, drank freely. Arising refreshed, he proceeded to look for the arrow that had missed its aim and which he soon found, after I had pointed out to him the place where it fell. He then searched in the running waters for something that he soon picked out, proving to be a fragment of vitreous quartz. Seating himself on a boulder near me, his next move was to unfasten and unwrap the sinew thread from the end of the arrow-shaft and detach and remove the piece of stone arrow-head remaining in it, for it had broken when it struck the rocky ground. He placed the thread of sinew in his mouth to soften it and render it pliable. Then holding the quartz splinter on its edge with his left hand, on a smooth boulder as an anvil, with a small trap pebble as a hammer, he gently tapped the stone, first on one edge, then on the other, striking off a tiny chip at each stroke until he soon had it reduced approximately to the dimensions he required. He had before seating himself removed his quiver from his shoulder, and at this stage untied from its strap a buckskin string that suspended the point of a deer's horn, seven or eight inches in length, notched or grooved at its small end in a peculiar manner that I had not before noticed. The savage saw that I was intensely interested in his work, and executed every movement deliberately and plainly in my view, as though he felt pride in his knowledge of the stone art. Now spreading the broad tail flap of his quiver in the palm of his left hand, with its inner or dressed side up, he placed upon it the quartz splinter he

had blocked out, and held it firmly in place with the two smaller fingers of the hand clasped over it. With the point of his horn punch he then, by firm and careful pressure, broke from the edges flake after flake from the point of the embryo arrow-head along to its base. Stopping a moment to inspect the stone, he would reverse it and repeat the cautious pressing on the other edge until directly its outline was that of the ordinary leaf-shaped, flint implement. He now reversed his deer-horn punch, when I noticed that it was ground, at its upper or large end, to an obtuse or diamond point at one side, somewhat like that of a wood-carver's burin. Apply this stout point, by the same mode of pressure as before, to each side of the broad end of the stone alternately, the stone now resting for solid support on the heavy muscles at the base of the thumb, he soon chipped out the indented, lateral notches, defining the shank of the arrow-head, which was now finished as completely, and perfectly proportioned, as any I ever saw. Fitting it in the cleft of the arrow-shaft, he took the slender thong from his mouth and soon had the new weapon securely fastened, his horn-punch tied to its place again, and, gathering up his quiver and bow, quickly vanished from view.

The whole process, from his selection of the stone adapted for his purpose to the last tuck of the sinew strand in adjusting the finished implement to its shaft, did not exceed twenty-five minutes of time.

The band of Indians to which this one belonged was known as the Nemshoos,* a branch of the Pah-Utes, generally designated as "Diggers" on the eastern side of the Sierra Nevada range, of whom I will give some further account in another paper. They soon began to visit our camps as persistent beggars, and frequently made arrow-points in our presence, by the method I have described, for the reward of food or cast-off clothing. In this industry—if it can be so called—they were indifferent about the material employed so long as it possessed the cleavage or flaking property required; and from pieces of broken junk bottles, or other thick glass, soon chipped out as neatly formed and delicate arrow-points as from obsidian or glassy quartz.

So far as my observations extended, these Indians practiced only the one method of making arrow-points of stone. Other Indians no doubt accomplished the same end by different modes of manipulating the same material. Catlin gives us, in his "Last Rambles Among the Indians," the following account of the manner in which arrow-points were made by the Apaches: "Every tribe has its factory in which these arrow-heads are made, and in those only certain adepts are allowed to make them for the use of the tribe.

"Erratic boulders of flint are collected (and sometimes brought an immense distance) and broken with a sort of sledge hammer made of a rounded pebble of hornstone, set in a twisted withe, holding the stone and forming a handle. The flint, at the indiscriminate blows of the sledge, is broken in a hundred pieces, and such flakes selected as, from the angles of their fracture and thickness, will answer as the basis of an arrow-head.

"The master workman, seated on the ground, lays one of these flakes on the palm of his left hand, holding it firmly down with two or more fingers of the same hand, and with his right hand, between the thumb and forefingers, places his chisel (or punch) on the point that is to be broken off, and a co-operator (a striker) sitting in front of him, with a mallet of very hard wood, strikes the chisel (or punch) on the upper end, flaking the flint off on the under side below each projecting point that is struck. The flint is then turned and chipped in the same manner from the opposite side, and so turned and chipped until the required shape and dimensions are obtained, all the fractures being made on the palm of the hand.

"In selecting a flake for the arrow-head, a nice judgment must be used or the attempt will fail; a flake with two opposite or parallel, or nearly parallel planes, is found, and of the thickness required for the center of the arrow-point. The first chipping reaches near to the center of these planes, but without quite breaking it away, and each chipping is shorter and shorter until

*Native races of the Pacific States. By Hubert H. Bancroft. 1875 p. 450. Vol. I.

the shape and the edge of the arrow-head are formed.

"The yielding elasticity of the palm of the hand enables the chip to come off without breaking the body of the flint, which would be the case if they were broken on a hard substance. These people have no metallic instruments to work with, and the instrument (punch) which they use, I was told, was a piece of bone; but on examining it I found it to be a substance much harder, made of the tooth (incisor) of the sperm whale, which cetaceans are often stranded on the coast of the Pacific. This punch is about six or seven inches in length and one inch in diameter, with one rounded side and two plane sides; therefore presenting one acute and two obtuse angles, to suit the points to be broken. This operation is very curious, both the holder and the striker singing, and the strokes of the mallet being given exactly in time with the music, with a sharp and rebounding blow, in which, the Indians tell us, is the great medicine (or mystery) of the operation."

In the Third Bulletin of the U. S. Geological and Geographical Survey is a paper entitled "Methods of Making Stone Weapons," by Paul Schumacher; from which the following extract is taken: "During my rambles among the remnants of our Pacific coast aborigines I had an opportunity, among the Klamath Indians, of gaining information of the manufacture of stone weapons, for which my interest was not a little stimulated by extensive collections made by our party among the deserted hearths of the coast tribes. I had the good luck to meet the last arrow-maker of the tribe, located on the right bank and near the mouth of the Klamath river, who has since joined his forefathers in the happy hunting ground. He showed me the mode of making stone weapons, of which the following is a description. For the manufacture of arrow and spear-points, knives, borers, adzes, etc., chert, chalcedony, jasper, agate, obsidian and similar stones of conchoidal fracture are used. The rock is first exposed to fire, and, after a thorough heating, rapidly cooled off, when it flakes readily into sherds of different sizes under the well-directed blows at its cleavage. The fragments are assorted, according to shape and size best corresponding to the weapon desired; the small ones, best fit in shape and thickness, are used for arrow-heads; similar sherds, but larger in size, for spear-points; the long, narrow pieces for borers, and so on. To work the flakes into the desired forms, certain tools are required, one of which is a stick, which is in form and thickness not unlike an arrow-shaft and about one and a half feet in length, to one end of which a point is fastened of some tough material, as the tooth of the sea lion or the horn of the elk, and even iron, among the present Klamaths, although the rock does not work as well, and brittles where the edges ought to be sharp. This hard point has a beveled curve, which form admits a gradual pressure to a limited space of the edge of the sherd. During this operation the rock is partially inwrapped in a piece of buckskin for better manipulation, its flat side resting against the fleshy part of the thumb of the left hand, only the edge to be worked being left exposed. The tool is worked with the right hand, while the lower part of the handle, usually ornamented, is held between the arm and the body so as to guide the instrument with a steady hand. With the first movement (as illustrated) larger flakes were detached, and the rock was roughly shaped into the desired form; while with the next movement—the punch pressed at an obtuse angle with the plane of the stone—long flakes were broken, which frequently reached the middle of the sherd, producing the ridge of the points

or knives; and by pressure on the edge at right angles the smaller chips of the cutting edge were worked. The work proceeded from the point, the most fragile part of the weapon, toward the stronger end. To work out the barbs and the projections of the arrow and spear-points, a bone needle is used, four to five inches long, with short, thick point and without a shaft."

As recently as June 27, 1854, Lieutenant E. G. Beckwith* found Indians at the headwaters of Sacramento river, near the California boundary line, who had not yet emerged from the "Stone Age." He says of them: "They claimed to be Pah-Utahs; and were entirely destitute of clothing and armed with superior bows of cedar and long, reed arrows, strengthened by inserting strong pieces of wood in their centers. * * * * One of them seated himself near me and made from a fragment of quartz, with a simple piece of round bone, one end of which was semi-spherical, with a small crease in it (as if worn by a thread) the sixteenth of an inch in depth, an arrowhead which was very sharp and piercing, and such as they use on all their arrows. The skill and rapidity with which it was made, without a blow, but by simply breaking the sharp edges with the creased bone by the strength of his hands—for the crease merely served to prevent the instrument from slipping, affording no leverage—was remarkable."

It is doubtful if any remnant of the Indian race on this continent still use implements and weapons of stone and are yet without knowledge of the practical use of metals. Aboriginal stone art has perhaps entirely disappeared from America; but there no doubt are many persons yet living who have, as myself, seen Indians as primitive and uncultured in all their methods and practices as any who existed here before the date of America's discovery.

For the advancement of Anthropological Science the observations of all such persons—now approaching the evening of life—should be placed upon record before they, too, pass away. J. F. SNYDER.

*Reports of Explorations for a R. R. route to the Pacific Coast. Washington, 1856. Vol II, p. 42.

AOSTA.

The "Augusta Praetoria Salassorum" of the Romans.

Situated at the head of the Aosta valley, at the confluence of the Doire and Buthier, two mountain streams, is the small village of Aosta in the province of Turin, north Italy, an ancient Roman town which in the olden days was called Augusta Praetoria Salassorum.

This valley and surrounding hills was once inhabited by a people very hostile to the Romans. They harassed all troops that crossed the Alps into Gaul over what is now known as the great St. Barnard Pass, and at one time boldly attacked the army of Caesar. The Emperor Augustus afterward sent several legions of the Imperial army under Terentius Varro, up this valley who subdued the tribe after a stubborn resistance; and then as a safeguard, and to hold the territory thus gained, including the pass, he built this small, strongly walled town, now known as Aosta. In my recent visit to Aosta, I was very much interested in the Roman ruins which are very numerous there, and venture to offer a brief account of them to the readers of your valuable magazine.

Ascending the valley road we enter the town through the Porta Praetoria, and proceeding a short distance, come to the Arch of Augustus. An inscription at its base, not ancient, however, informed us that the arch was erected to commemorate the victories of Augustus over the native mountain tribes in the year B. C. 24, or in the Roman year 730. I was unable to ascertain the exact dimensions of this grand monument, but estimate it to be not less than fifty feet high by sixty in width and perhaps twenty feet in thickness. Its lower portion is con-

structed of massive blocks of cut stone, many of them seven feet in length and weighing five tons or more. The upper part of the arch is made of brick work covered with stucco. The preservation of this stucco finish, in this altitude, after the lapse of nineteen centuries, is wonderful. Much of it still adheres to the bricks, as though a part of them, in heroic figures, while the greater part of it is smooth and looks and feels like polished marble. At each of the eight corners, and in the middle of each end is a large Corinthian pilaster—ten in all—rising from a few feet of the ground to the cornice above. Like the arch of Titus in Rome, this one has but one opening, approximately, thirty feet high to the keystone of the arch by twenty-five in width. It is indeed a magnificent structure, built to endure the ravages of time and the elements, which so far have made but little impression on it, and it bids fair to last for ages to come if not destroyed by human agency. But a short distance from the arch are the ruins of an old bridge built by the Romans across a mountain stream, which, long after the construction of the bridge, changed its course and cut for itself a new channel. Modern houses now occupy the deserted bed of the river, and but one of the several arches that formerly spanned the ravine—the one nearest the town—is visible, and under that flows the water of a small spring issuing from the ground near by.

The huge old Roman wall can be traced all around the town and in many places it remains as left by the masons who built it. It enclosed a rectangle of about 2250 feet by 1850 feet in extent, and it averaged sixteen feet in height. Its mode of construction was quite peculiar; the material employed being coarse concrete of water worn pebbles five or six inches in diameter set irregularly in cement. This was faced on the exterior with blocks of cut stone, each two feet long, ten inches high and eight inches thick, the entire wall being five feet in thickness at the base.

At least two-thirds of the original wall remains standing with two splendid gateways of cut stone. There is no doubt that it afforded the place ample protection against the assaults of all barbarian enemies, equipped with only such agencies of warfare as were known at that time. Within the limits of the walled area are several interesting ruins antedating the Christian era; but generally much dilapidated. The most conspicuous of them is the amphitheater, solidly built and of fine proportions, but now in great part buried in rubbish. Of the theatre, a former majestic edifice, all that remains are a few arches, columns and foundation stones.

In many of the cellars of the modern houses can be seen the fine pavements and mosaic floors of the ancient Roman residences. The reason of this is that during the many centuries that have passed since the town was founded and then abandoned by its Roman occupants, the accumulation of soil has raised its level several feet above the ancient surface. It is probable that excavations down to that original surface would bring to light many relics of domestic life of that period of great interest. This quaint old town containing, in its rugged mountain isolation, such vestiges of Roman grandeur and genius of the gorgeous Augustin age, is a shrine worthy of the pilgrim homage of all students of ancient history. It was a military stronghold of vast importance before our Savior's birth, and shared with the Eternal City the splendor of its power and humiliation of its fall. It should be well cared for and preserved as a valued relic of a brilliant age and illustrious people.

D. I. Bushnell, Jr.

Lucern, Switzerland.

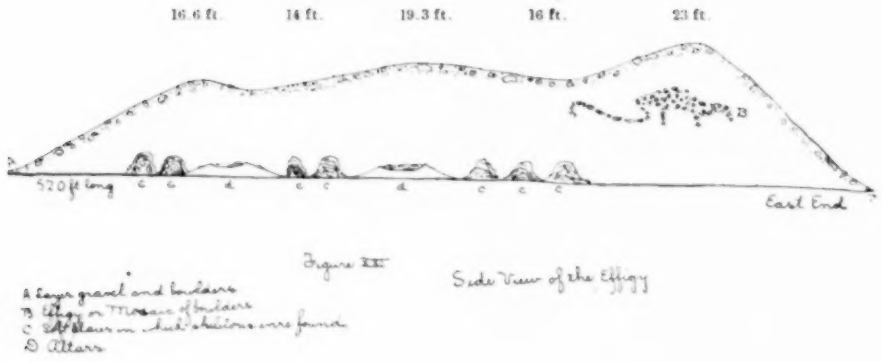


Figure XXI

Side View of the Effigy

A Layer gravel and boulders
B Effigy or Mosaic of boulders
C Altars in which skeletons were found
D Altars

THE HOPEWELL GROUP.

WARREN KING MOOREHEAD.

(*Continued.*)

Dr. Thomas Wilson, Curator of Prehistoric Anthropology at the Smithsonian Institution, visited Camp Hopewell twice. It was during the digging of mound No. 23 that he asked me if I intended to open the Effigy. Some archaeologists had said it was of glacial origin and not artificial. We decided to settle its character, and calling two of the workmen, we sunk a shaft some ten feet in the center. Finding charcoal and bits of burnt earth (slight traces), convinced us that the great Effigy was the work of men's hands. Knowing that it would cost more than $2000 to properly explore so enormous a body of earth, both he and I thought that it was not a matter to be hastily agreed upon. In spite of the value of articles exhumed up to date, the Chief of the Department of Anthropology was being "punched by the Auditor of Accounts," at Chicago, and he naturally stirred me up, being his subordinate, cautioning economy, etc. I have always maintained that none of the World's Fair people ever appreciated the immense amount of earth we had to remove (nearly 400,000 yards), and the consequent necessary expense. No force—and I have seen many of the surveys at work—ever worked harder, giving extra hours without extra pay, sat up more nights (in winter) guarding finds, or took more of a personal interest in the work. So there was nothing for me to do—as those above me never visited the group, even at a time when great discoveries were made—but to "take the bull by the horns," and direct operations as best I could alone.

Reference to the map (*) will give readers an idea of the position and appearance of the Effigy. It is of earth, but small stones and gravel cover the top, hence the statement by some that it was glacial in formation. The east end is 23 feet high; the central section is 19.3, and the western 16.6 feet respectively. Two depressions lying between the ends are 16 and 14 feet high. Figure XXI gives a side view of the mound and also the altitude at various points. I have stated (page 120, May Antiquarian) its base measurements.

The view presented to one standing on top gives the idea of a rude effigy—the human trunk. Its internal structure gave no evidence of such a character (unless we consider the boulder mosaics), for the mound was composed of a number of small tumuli added from time to time and finally covered by a mass of earth, giving its present outline. As the term is a convenient

*Opposite page 114, May Antiquarian.

one and will save future writers confusion between this and similar structures, it had best stand.

Dr. Wilson had left before the teams began work upon the Effigy. I was called away for a day. It was during my absence that the plows uncovered two boulder mosaics, one on each side of the first or east end cut. Dr. Cresson made drawings of them. Prof. Holmes saw them after the teams had torn out all but a portion of a tail and one leg. Cresson's drawings are in Chicago and I have no copy here, but I reproduce one in Figure XXI—a fairly accurate copy of his sketches. I saw such portions as remained— leg, tail and neck— upon my return that evening. The boulder mosaics were very rude, about one hundred feet long, and were thought by Cresson to represent panthers. They were some three feet below the surface.

Our first cut, 200 feet long, 60 feet wide and 23 feet deep, east end, cost over $305,

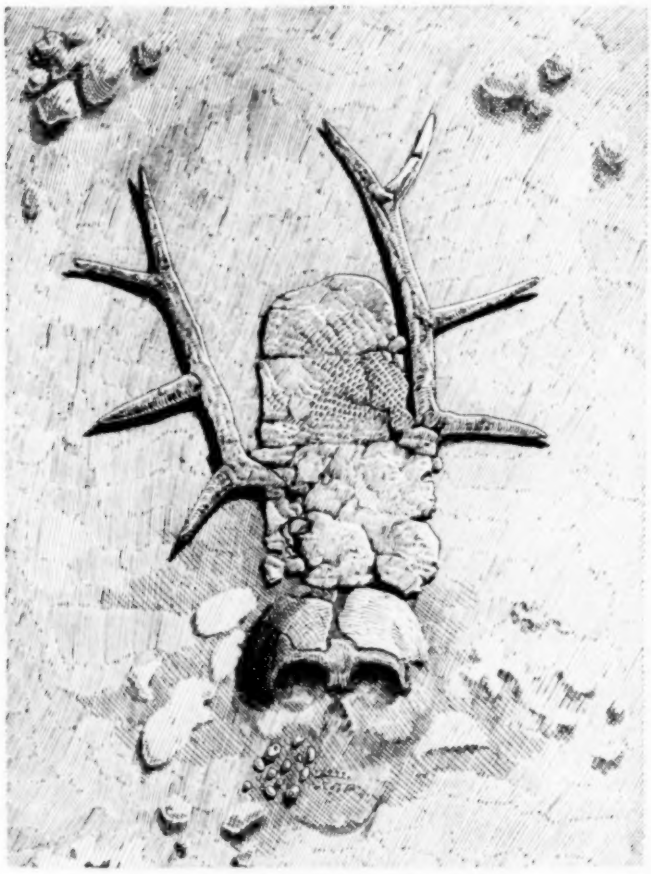


Fig. XXII—Head-dress of Skeleton 248.

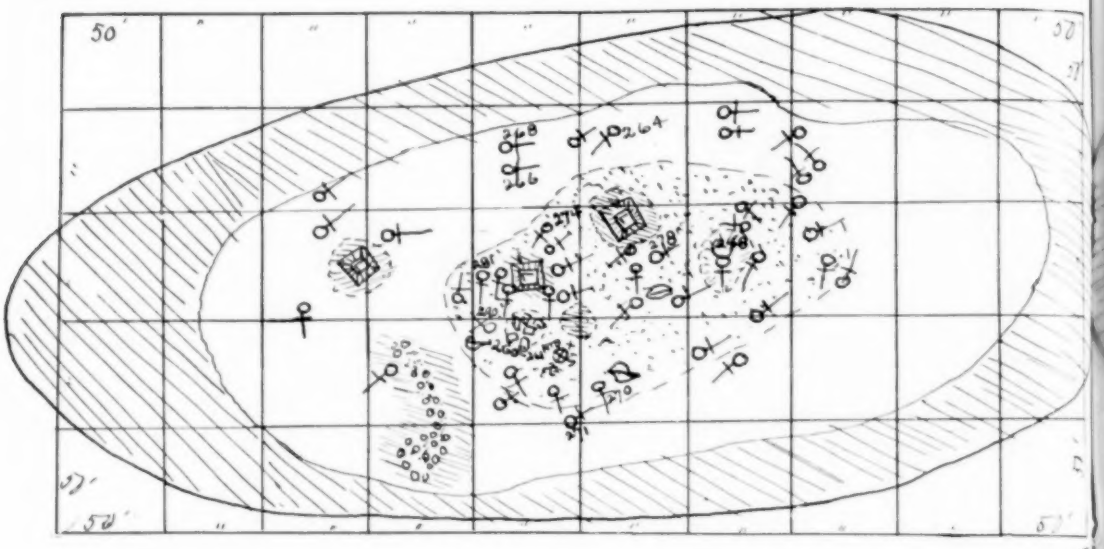


Fig. XXIII—Ground Plan of the Effigy. Each Square represents 50 feet. The Skeletons and Altars and Copper Deposits are exaggerated, else they could not be seen.

and yielded us a fragment of pottery, a few bones and some post holes. I confess that we lost heart and I looked forward to the receipt of a stiff letter from my Chief with apprehension, but decided to try a second cut a little narrower than the first, and started the teams upon it November 2nd.

Field Notes—"Nov. 12th, '91. The second cut in the Effigy mound has reached a point but five feet from the base line. Decaying skeletons noted in several places in the course of sinking experimental shafts led us to exercise great care. Abandoning the teams, we put in men with shovels and hand trowels and completed the examination by hand. In this section hundreds of small masses of various colored earths were observed. Short irregular layers of sand also extended in various directions. Skeletons 242, 3, 4 and 5 were uncovered, with a few shells, beads and copper ear ornaments."

The afternoon of Nov. 14th was stormy and cold. Dr. Cresson and I went to the team a little before five o'clock and hitched up. Our men were to join us in a few minutes and we would drive to our Chillicothe quarters.*

Peter Sammons, who had been with me four seasons in the field came running to the wagon much excited. "We have found the greatest man you ever saw," he cried. We ran over, hearing the men in the cut cheering as we approached. Sure enough, a little north of the center of the pit lay No. 248, called by the newspapers "King of the Mound Builders." Certainly they gave him a sensational name, but who can deny that the title may not be properly applied?

*Nov. 1st we had rented a house in town, it being too cold to camp longer. We left two tents at the mounds for shelter in case of storm. We drove out at daylight each day, making the trip in 40 or 45 minutes. (7 miles.)

It was getting dark, snow was flying and the thermometer ranged about twenty above zero. But what cared our old, hardened diggers for cold or snow or darkness? We all knew that we had found something of importance. It must not be disturbed that night, but covered, protected and watched over until morning. I started all hands to town but Sammons and ordered them to bring out supper, midnight lunch, breakfast, some cooking utensils and blankets. I never understood how they made the trip so quickly, but in a very short time the cook himself came with plenty of food and blankets. We three sat up all night, first having covered the "King"with hay, then earth, and lastly we stretched a tent fly over him.

The discovery was made by a man working with a hand trowel. He found several copper plates, the decayed skull and beads. Calling two of his companions, they speedily traced the antlers, etc., and then sent for us. Nothing had been disturbed; for our force was composed of careful and skillful workers, and in the morning I found the skeleton to be uninjured. It was headed north, of ordinary size and poorly preserved. A photograph of the remains does not clearly show the bones and but few of the relics. I therefore reproduce only the head-dress in Figure XXII.

Figure XXIII, ground plan of the Effigy, will show the position of 248, as well as other notable remains.

It is no exaggeration to state that the entire person of No. 248 glittered with mica, pearl, shell and copper. All that the ancients could give him were showered upon his remains. About the legs were numerous beads and fragments of copper plates. On the chest and under the back were several copper plates of large size. Perhaps a thousand beads, many of them of pearl, were strewn everywhere about him. Bear teeth, cut and sawed into fantastic shapes, were also found with the remains. There were copper spool-shaped ornaments and panther teeth among the ribs. Upon the copper there was a perfect imprint of cloth, and many of the beads had been sewed to the cloth. As near as I could judge, a cloth

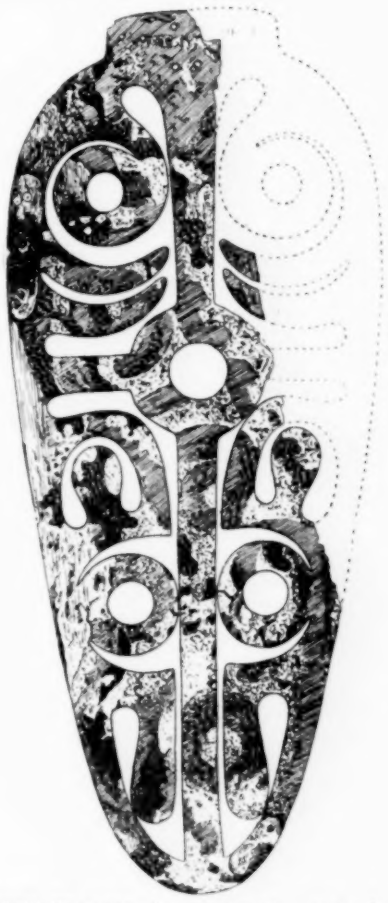


Fig. XXIV—Effigy Mound; design in thin copper. ½ size.

or skirt extended to the knees of the skeleton. At its right shoulder was a large platform pipe and an agate spear head. Over the cranium had been placed a cap or helmet of copper. This was corroded and could only be taken out in fragments. From the crown of the head there extended wooden antlers, covered with thin rolls of sheet copper. They were fifteen by twenty inches, with four prongs on each side. The imitation was admirable. The head-dress is exceedingly remarkable and of great interest to students of American archaeology. These antlers were exceedingly frail. They could only be removed by taking out the entire mass of earth enclosing them. This

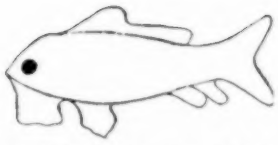


Fig. XXV—Effigy mound. Fish in thin copper; ¼ size.

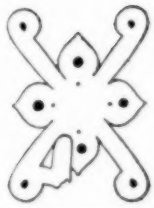


Fig. XXVI—Effigy mound. Design in thin copper; 1-10 size.

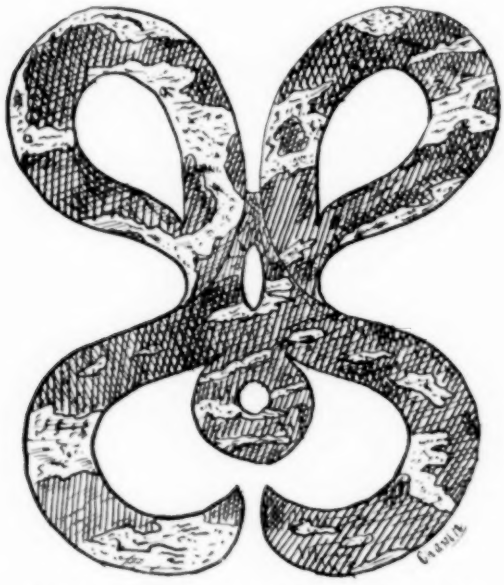


Fig. XXVII—Effigy mound. Design in thin copper; ½ size.

we did, boxing around a mass thirty by twenty-six inches, just as we take out the altars.

In Cut No. 2 quite a number of skeletons were found, accompanied by several bone and shell ornaments.

It is a satisfaction to know that the head-dress went to Boston and from thence to Chicago safely. It is now, with all the Hopewell finds, in the Field Columbian Museum.

What does the burial of "the King" with head-dress, plates, etc., signify? We will consider it when we study, presently, the evidences of symbolism in copper.

While we dug out all the bottom of the second cut, the teams worked upon another section. Rain delayed us somewhat, but towards the end of November, cut No. 3 was ready to be worked by hand. In it we found the only relic deposit of the entire structure lying above the base line. There were 120 pieces of sheet copper between three and four feet above the bottom, south of the center. They must have been twelve or fifteen feet below the surface.

Field Notes—"List of sheet copper found in Cut No. 3. A long mass of copper covered with wood on one side, squares and circles, patterns, etc., on the other. Eighteen copper rings and bracelets; (some 'double rings'). Two sets of anklets joined together by oxidation, three in one and two in the other. Five saucer-shaped

discs. Two swastika croses, a saw pattern, a large grotesque arrow head and several unknown forms, stuck together. One wheel or circular pattern with straight and curved lines and bars running across it. Small discs, wheels, etc. One whole fish (evidently a sucker), one fragmentary fish. Two diamond shaped stencils, four spool-shaped ornaments, four comb-shaped objects, two spoon-shaped objects, one St. Andrew's cross, fifty-one various pieces resembling washers, etc. Ten small circles, and other fragments." (See figures.)

No bones were near this singular copper find. It occupied a space three by four feet, and had somewhat discolored the surrounding earth. No burnt earth, ashes, charcoal, etc., acompanied the sheets. They seem to have been intentionally thrown down (as an offering), when the mound was partially complete.

As in the case of all larger discoveries, the find was made just before quitting time, but was taken up by lantern light and removed to town. Although there appeared to be nothing else, in order that no mistake might occur, a man was left on guard all night. Additional digging in the morning revealed nothing.

Fig. XXVIII—Effigy mound; Bear symbol. $\frac{1}{2}$ size.

I reproduce thirteen of the sheet copper objects. The illustrations are from drawings made in the Field Columbian Museum. I am also indebted to Dr. Thomas Wilson for the loan of illustrations used in "The Swastika."

I shall defer descriptions until after presenting other copper deposits of the Effigy.

December 14th marks the next important find. During the first two weeks in December, in spite of intense cold and snow, we continued to work, taking out a number of skeletons. The list given below covers not only these, but brings up the work to January 4th or 5th, '92:

262—Intrusive burial, stone celt. (Near surface.)

264—Drill at the head, beads, two copper celts.

266—Eagle effigy.

267—Two ear ornaments and beads.

268—Copper plate and beads.

269—Ocean shell and copper plates.

270—Copper ax, bear teeth, mica, copper plate.

271—Mica, cut circular.

274—Two copper ear ornaments and a stone celt. Near this an ash pit in which we found a pipe and some cannel coal.

277—Copper plate.

278—Cannel coal ornament, carved human femur, two shell ornaments, two copper ear ornaments and bear teeth.

286—Shell ornaments and beads.

Near the center of the cut we uncovered skeletons (so much decayed that even fragments could not be removed), 260 and 261. I think that these were in the original center of the mound, and were the first interments made. The small mound erected over them evidently permitted water to collect about the remains. One of the dome-shaped structures, such as have been described, surrounded them, the earth was very loose and the structure appeared to have been larger than that built around any other skeleton. Both skeletons lay with their heads towards the west. The sheet copper had been found ten feet south of them. Right over the skeletons were sixty-six copper hatchets, ranging from four ounces to thirty-eight pounds in weight; twenty-three plates, several dozen broken plates, many thousand pearl and shell beads, perforated teeth and bear tusks, fragments of wood, fragments of meteoric iron, three or four meteoric iron celts, two eagle effigies (badly oxodized), fragments of carved bones, a stone celt, a broken shell and several copper figures of unknown form and use.

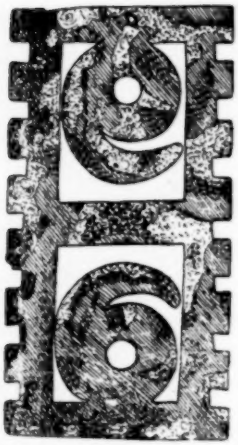


Fig. XXIX—Effigy mound. Design in thin copper; ⅓ size.

Fig. XXX—Effigy mound. Cosmic Symbol in thin copper; ⅓ size.

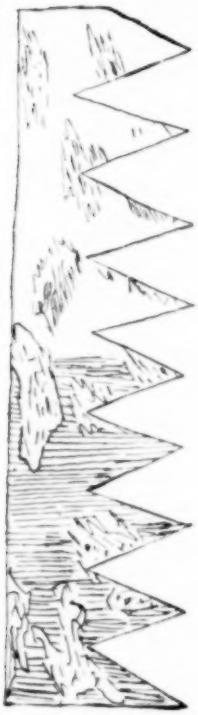


Fig. XXXI. Design in sheet copper.

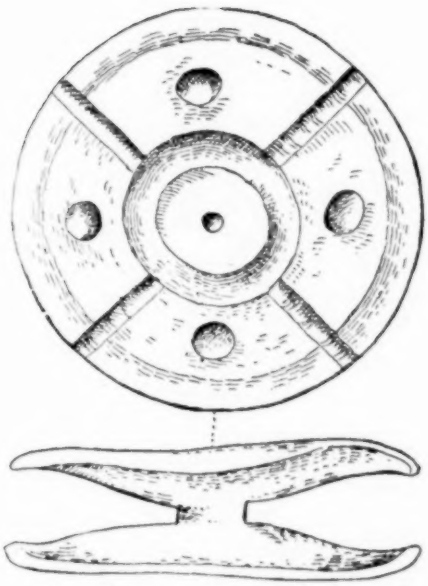


Fig. XXXIII—Effigy mound. Spool-ceremonial ornament of copper; full size.

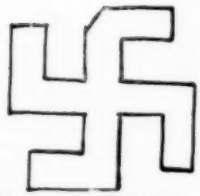


Fig. XXXIV—Swastika Cross in copper; ¼ size.

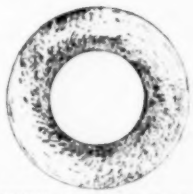


Fig. XXXV—Broad Copper Ring; ⅓ size.

Fig. XXXVI—Circular Design in copper; 1-5 size.

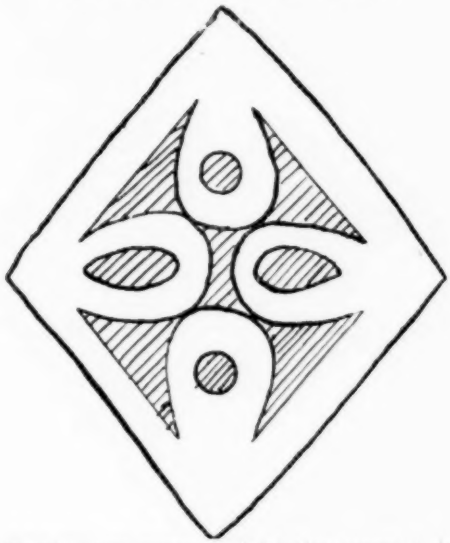


Fig. XXXVII—Four corners, or winds in sheet copper; ¼ size.

After having guarded it all night with nearly the entire force, I began work with a hand trowel immediately after breakfast and uncovered several of the specimens.*

Figures XXXII shows the copper in position after it had been carefully exposed. The photograph was taken about two o'clock in the afternoon. The soap boxes shown are half full of beads, stained earth and scales of copper. Mr. Lewis W. Gunckel, who is much interested in archaeology, having published a number of papers on American hieroglyphics, stands at the right. Peter, who found the "King" stands beyond me and leans upon a stick.

While uncovering plates and hatchets, I came upon an end of a very large piece of copper. It was four inches wide, an inch thick and appeared to be a rounded nugget. Readers can imagine my feelings as the trowel exposed inch after inch and the specimen continued to thicken and broaden out. To say that the visitors* and men looked on in astonishment but mildly expresses the feelings of all concerned. Fifteen inches had been uncovered and yet an unknown portion of the great copper object, was buried in the ground. For fifteen minutes longer I worked and then my trowel rounded the edge of the largest worked (finished) copper object made by prehistoric man in the world. In spite of its size, the axe was very symmetrical. It weighed thirty-eight pounds and was twenty-two inches long. I do not remember the width of the blade exactly, but think it to have been six inches.

*It must be remembered that we only had an inkling of the nature of the find at dusk the previous evening.

*Word having reached Chillicothe, more than two hundred persons drove out and arranged themselves along the banks above.

(To be continued.)

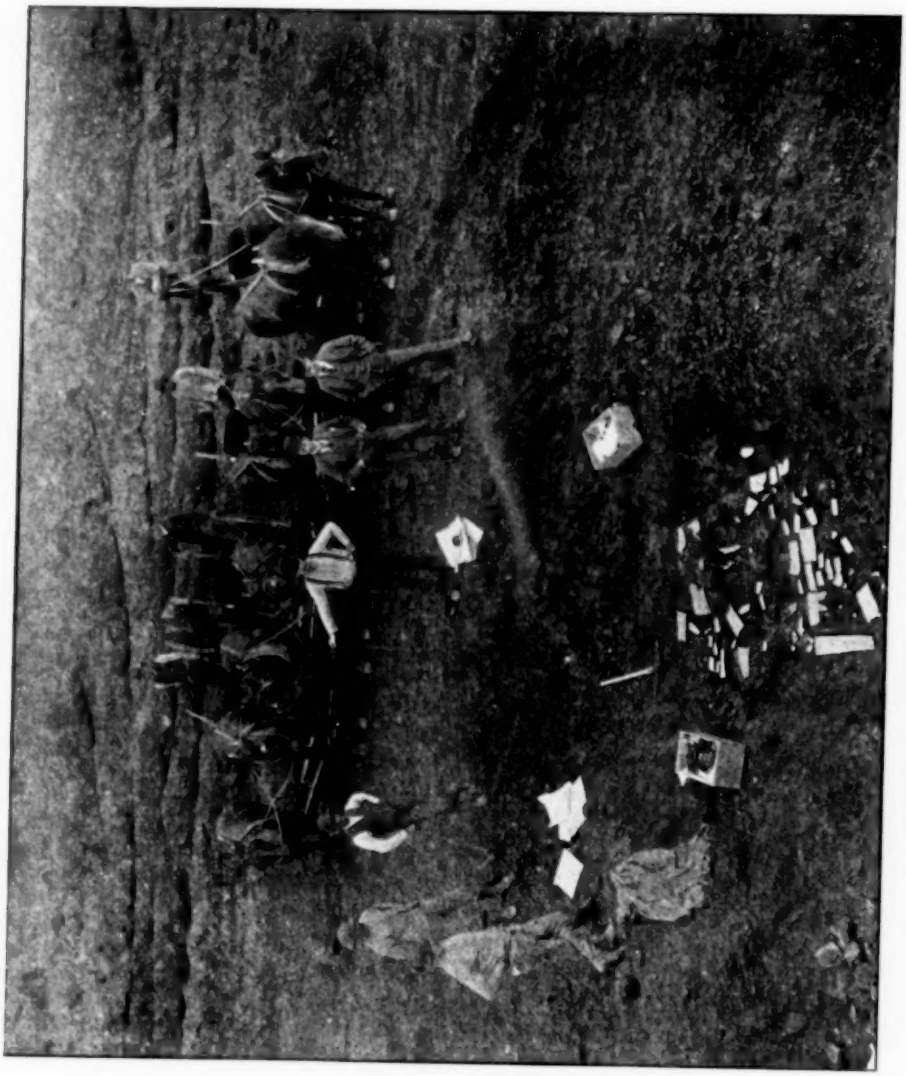


Fig. XXXII—Cut No. 3 in Effigy. Copper axes and plates in foreground lying as found.

The teams were brought in and arranged along the wall of the cut on ground 2 feet higher than the deposit and 30 to 40 feet distant.

EDITORIAL.

Anthropologists will awake with eager interest the reports of the several expeditions sent to the far northwest to discover, if possible, traces of the first introduction of the Indian upon this continent from that direction. It is hoped—and some expect—that sufficient data will there be secured to finally solve that perplexing problem.

But, though undoubted evidence of early migrations of mankind from the Asiatic shores to ours may be discovered, will that fact fully account for the peopling of America by a race unknown in the eastern hemisphere? The Indian is a distinct type of man, and the unity of the aboriginal American race, the Eskimos excepted, is generally accepted as true. It is also true that the Indian type is nowhere found in Asia. It has been demonstrated that the islands of the southern Pacific ocean received their first inhabitants from the Malay archipelago; yet excluding an average conformity of crania and certain linguistic affinities, the natives of Polynesia and of Malay differed as widely from each other as either did from the native American. The Hawaiians first seen by Captain Cook were probably descendants of castaway Japanese or Chinese, but had outgrown every racial characteristic of their Asiatic progenitors.

These facts suggest the possible co-operative agency of natural forces in molding the suigeneris American Indian. Our continent may have received some of its first people from northeastern Asia. Some from other parts of the old world may have been stranded on the Peruvian coast and there founded the Inca empire. If the report that ancient Chinese inscriptions have been found in Mexico is true, it follows that adventurous, or unfortunate celestials were in that quarter at an early day. Accessions from some bearded eastern nation may have reached Yucatan and there planted the nucleus of Maya civilization. Other stragglers from the far northwest, tempest-tossed or drifted by ocean currents were, perhops, involuntarily transplanted on out New England seaboard.

The effects of climate, food, and other environments peculiarly American, operating through centuries of time, we will suppose resulted here—as similar agencies did in the Pacific islands—in transforming the heterogeneous stocks into one people and crystalizing their composite progeny in one monogeneous and distinct race of American Indians. This plausible hypothesis leads to curious speculations regarding our own destiny. The first American race is rapidly approaching extinction. Will the future American race, influenced by the same persisting physical causes, also assume the Indian type? As a nation we are yet embryonic; an agglomerated mass of unassimilated humanity drawn from all nationalities of the earth. In time the influx of population from abroad will cease, and then will commence—if it has not already commenced—the genesis of another distinctively American people. It will not be Indian. Because our preponderating basic element is Caucasian, and for the further reason that American isolation, an important factor in evolving the primitive Indian, is no longer possible. In the older and more stable districts of our country some of the ultimate products of transmutation agencies have been noticed. The blue eyes and flaxen hair of early Scandinavian colonists of Delaware; the sturdy Saxon frame and blonde features of the Germans who settled Pennsylvania; the broad-shouldered, ruddy chevaliers of old Virginia, and the squatty, lymphatic Dutch of New Amsterdam have, by blending with each other and with other foreign stocks, disappeared in descendants of an indigenous type having dark hair and eyes, brunette complexion and tall, lanky forms.

From these and other formative indications the inference to be drawn is that the coming American will be dolicocephalous, or long-headed, with deep-set eyes, sharp features, smoky skin and spare, raw-boned body. Physically he will be the inferior of his pre-Columbian predecessors, the Indian, and morally not much his superior.

A correspondent in California has sent us a voluminous history of man's advent in America 35,000 years ago, and his subsequent migrations, wars, vicissitudes and progress from that time to the landing of Columbus. It purports to emanate from the spirit world through the mediumship of the great novelist, Charles Dickens. The

Antiquarian is not engaged in publishing fiction—excepting sometimes by mistake. And if it was, this particular production falls so far below Mr. Dickens' weakest efforts in that line when living that doubts of its authenticity would prompt us to reject it; and its great length precludes its publication as a literary curiosity.

We briefly noticed in our last issue that Prof. George P. Winship, of Harvard University, had supplied in the 14th annual report of the U. S. Bureau of Ethnology, a great want long felt by every student of early American history. His rendition of Coronado's expedition in 1540-42, including a general sketch of the causes instigating it; and of the condition of public affairs in Mexico at that time; of previous expeditions in the south and southwest and what they discovered; the full Spanish text of Castenedas' account of the great march and its literal tranlation; Coronado's official report to the crown, and Jarmarillo's narrative, with several old maps and profuse ilustrations, constituting a thoroughly exhaustive and masterly work that should find a prominent place in the library of every historical student.

For the first time the great isolated rock near the ancient pueblo of Acoma in New Mexico, known as the Mesa Encantador (enchanted hill), was successfully ascended, on July 20, by Prof. Libby and party. The Mesa rises from the general level of the plain to an altitude of 500 feet; its irregular sides of bare rock being almost perpendicular for half of its height. It is an outline of sedimentary formation, that has resisted the erosion of elements and forces that carved out its separation from the tablelands to the west, and is a noted landmark, held in superstitious veneration by the Indians, who have many traditions and legends of its occupancy by their ancestors and subsequently by mythical beings of suprenal powers.

Prof. Libby went prepared with an outfit of the coast life-saving service, and succeeded at the second trial, in firing a ball, with small cord attached, from a two-inch gun, over the rock. This cord was replaced by pulling over a larger, and still larger rope and then, with necessary blocks and rigging and a boatswain's chair, the party were easily hauled up to the top by two-horse power. Says Prof. Libby:

"The necessary instruments, camera, etc., were lashed to the chair, and, after securing myself in the chair, I gave the word to start. The horses moved off and I passed on and up over the 700 feet of rope, taking two minutes and 40 seconds to reach the top. The chair was then lowered and Mr. Pierce followed me to my airy location.

"Then came a careful search during the remaining hours of daylight. Every portion of the fifteen or sixteen acres of broken surface was carefully examined. No traces of former inhabitants were found. Further, no altars or traces of prayer sticks wer found. Not the slightest trace was found which would enable me to believe that a human foot had ever before passed over the top of this famous rock. A few agile lizards and several gray rats were the only occupants of this castle in the air. Some fine specimens of stunted pines, a few species of flowering plants and the ubiquitous sage brush lent a variety to the surface on the line of color of the bright sandstone. Some photographs were made. The views in all directions were very striking.

"The rock itself is an impressive fragment of the sedimentary deposit which at one time filled the whole of this Acoma basin, but looks as though it had been shoved up through the bottom of the valley." J. F. S.

Our associate editor, Mr. Harlan I. Smith, writes from Kamloops, B. C., that he is finding "jade" axes, carved bone awls, etc. He says that the archaeology of the region is but slightly known and he anticipates discoveries of value. It would seem at first glance that the finding of "jade" implements on the Pacific coast so far north might prove that the jade in Central America came from Asia by way of the Behring Straits. This is simply a suggestion on our part, but at any rate, the finding of "jade" as it is called is interesting and unusual, and archaeologists can look forward with anticipation to the publication of Mr. Smith's report upon his return. He, however, is of the opinion that this is not the Asiatic jade, but only an impure variety. C. L.

Some of the important anthropological collections including the recent additions in the American Museum of Natural History of New York have now been arranged, under the curatorship of Prof. F. W. Putnam.

The new hall of Anthropology, containing the division of Ethnology, is on the ground floor of the old building, under the charge of Dr. Franz Boas, and in it are the groups in plaster illustrating the life of the Indians of the north Pacific coast and Labrador; a model of a village on Vancouver Island; collections illustrating the customs of the Indians of the interior of British Columbia; collections from the Eskimo of Alaska; the Peary collection, illustrating the life of the Arctic Highlanders, the most northern people known in Greenland; the Lumholtz collection from the Indian tribes of Northern Mexico; collections from the islands of the Western Pacific Ocean, embracing the region from New Guinea to Fiji.

On the gallery floor in the east wing are collections illustrating the life of the North American Indians and the Indians of Guatemala; collections from the natives of South America, Africa, Java and the Polynesian Islands. The North American collections are very incomplete and no time will be lost in securing complete collections where yet this opportunity remains in any of the various regions.

The division of Archaeology, on the upper floor of the main building, is under the charge of Mr. A. H. Saville. It includes the Bandelier collection from the region of Peru and Bolivia. It embraces rich textile fabrics preserved in that dry climate, gold and silver figures and an instructive series of pottery from various regions in Peru. Here also are the collections illustrating the life of the ancient cliff dwellers of Southern Colorado and Utah; collections from Northern, Central and Southern Mexico; carvings from the prehistoric city of Copan, Honduras; collections illustrating the life of the ancient mound builders of the Ohio Valley; an archaeological collection from Wayslick, Kentucky, arranged on an ethnological basis; and a large collection from the islands of Southern California.

On the ground floor of main building, suspended on the wall of the vestibule is the Charnay collection of casts from prehistoric buildings in Mexico and Central America and of sculptures in the National Museum of Mexico.

On the mountain side north of Spence's Bridge in British Columbia is a boulder upon which the Thompson River Indians years ago made an interesting rock painting. The paint used was red ochre mixed with grease. The grease preserves the paint from the effects of the rain and weather. The region is one of almost desert dryness and the cactus and sage brush grow near the boulder. Mr. James Teit has given an explanation of these pictures in Vol. VIII, 1896, of the Bulletin of the American Museum of Natural History.

Prof. Otis T. Mason, the Ethnologist of the United States National Museum, has been honored with L.L. D., by the Columbian University.

Apropos of Prof. Mason's paper on "Environments," it may be of interest to note that a series of collections is now on exhibition in the department of Ethnology, of the American Museum of Natural History; showing the dependence of a people on its environment and on the natural products of its country. In the northwest coast collection the users of the various products of the cedar tree illustrate this point. Cedar products are of extreme importance to the people of the northwest American coast.

H. I. S.

Volume VIII, of the Bulletin of the American Museum of Natural History, which was issued for the year 1896, is the first bulletin of the Museum containing papers on anthropological subjects.

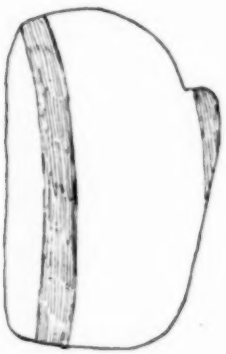
In it was printed the paper of Commodore Andrew E. Douglass, entitled "A Tale of the Geographic Distribution of American Indian Relics," etc, to which reference was made in the June issue of this Journal. "The Temple of Tepoztlan, Mexico," by Marshall H. Saville, and "A Rock Painting of the Thompson River Indians, British Columbia," by James Teit, constitute the other anthropological papers of the volume. H. I. S.

CORRESPONDENCE.

Editor of The Antiquarian:

The Sandal Last, the subject of your article in the May number of The Antiquarian, is still to me the same mysterious thing it was when the one in your possession was found some years ago.

A great many have been found since that time, and the most careful student has been unable to find any use for them other than you mention in your article. Baron Nordenskiold had a fine specimen, which is now in the Academy of Science at Stockholm. The Hyde Collection in the American Museum of National History in New York contains several fine specimens. The state collection of Colorado, in the Capitol building at Denver, contains several, one of which is of very fine white stone.



Those in the collection at the University of Pennsylvania vary in size considerably, one of them being 16 inches long and 8 or 9 inches wide, if I remember correctly; and one just found here, made from a piece of pottery, is two inches long by one and a quarter wide, and five-sixteenths of an inch thick. It was found on the floor of one of the excavated rooms among broken pottery, but not in connection with anything to determine its use. Many of them have been found here (Chaco Canon, N. M.); also in Marsh Pass, Arizona; Grand Gulch and Allen Canon, Utah, and in many of the Cliff Houses of Montezuma county, Colorado, both in the Cliff Dwelling and Valley Ruins, and in no case have we found the sandal and this stone in connection in any way. And yet that is the only probable use we can find for them. Sandals have been found in great numbers partially completed, from fine threads of yucca to the whole leaf, and all seemed to be worked off-hand. Those made of fine thread and unfinished have been found with the loose ends tied in a bunch to keep from tangling until time could be had to complete them. The coarser kinds merely had the ends sticking out at all angles. In all cases the toe was made first. I refer here only to the sandal of the Cliff and Mesa Dwellers, as the basket-maker made a round and a square-toed sandal with the same material, but without the offset at the little toe, specimens of which can be seen in great variety in the University of Pennsylvania collection and in the American Museum at New York City. We have in our Museum at the ranch hundreds of specimens of the sandals, and several of the sandal-shaped stones from Arizona and from no particular place about the various ruins in which they were found. We hope to establish beyond a doubt the use of these queer implements, and when it is done we shall be glad to make it known.

RICHARD WETHERILL.

Mancos, Colorado.

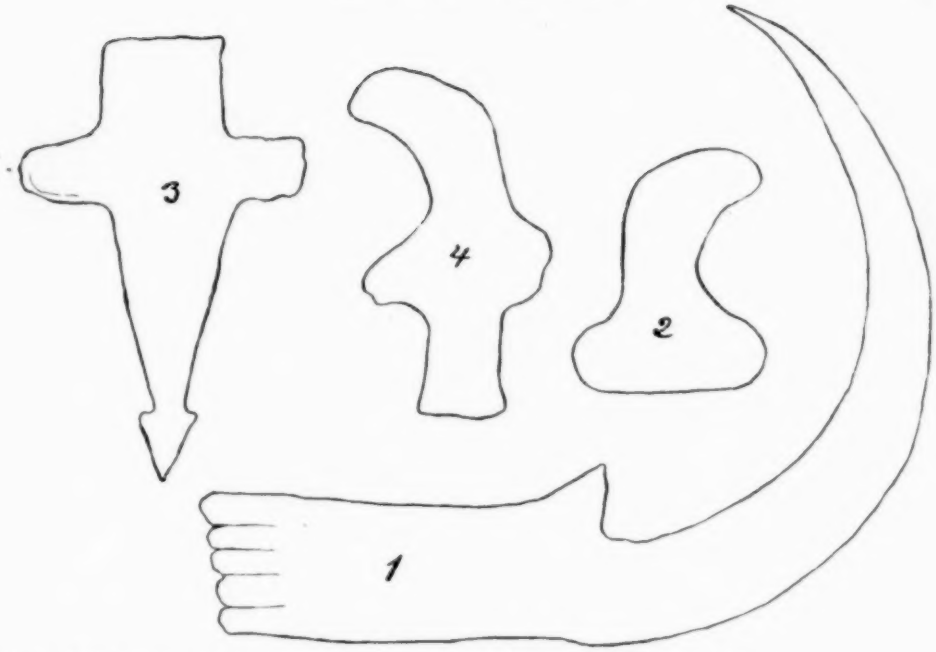
(The diminutive, so-called "Sandal Last" figured, and mentioned by Mr. Wetherill as having been made from a pottery fragment, we would suggest was a toy fashioned by some fond mother for the amusement of her child. In the Museum of the Missouri Historical Society at St. Louis, is one of these strange objects from a Cliff House in the Mesa Verde, made of pottery ware or baked clay, with an inter-mixture of sand and lime. It has the same general form as those carved of stone, represented by the small one figured above, and is ten and a half inches in length, by five and a fourth inches in width at the broadest part, and nearly three-fourths of an inch thick. Its edges and one surface are plain and comparatively smooth; but the other surface is finely ornamented with intricate, scroll-like designs, evidently impressed with a die or stamp into the material when it was soft and plastic. This puzzling specimen presents a somewhat broken and battered appearance, as though from hard usage, but none of the polished smoothness of those made of stone, or of the round, indented, "discoidal stones" made of the same hard-baked pottery composition.—Editor.)

Editor of The Antiquarian:

There is a stone in possession of the Bureau of Ethnology similar to the one in possession of Mr. Hegler, which you illustrate on p. 192, July Antiquarian. I sent the stone to the Bureau, I think, in 1890, but have seen no mention nor description of it in any of the Smithsonian publications.

The stone mentioned was a little longer in the greater and a little smaller in the lesser diameter than the one you illustrate. The opening was through the longer diameter, was uniform in size, and the groove was parallel with opening; material and finish identical with the one you illustrate. I have not received from the Bureau any information in regard to its use, and do not care to venture an opinion.

I presume that Prof. Powell or Prof. Holmes might furnish a satisfactory answer to your inquiry. A. J. MARKS. Toledo, Ohio.



Editor of The Antiquarian:

In the July issue of The Antiquarian Mr. Hegler, of Washington, Ohio, sends a sketch of a polished slate specimen. I have three in my cabinet; one from Coshocton, one from Knox and one from Huron counties, Ohio. All have grooves parallel to the opening through the center. W. C. MILLS.

Chicago, Ohio.

Editor of The Antiquarian:

I have figures of two carved stones like the one figured and described by A. Hegler in July Antiquarian. One was offered me in Toronto, in August, 1889, by Mr. Merryweather of Onio, and was found in Batavia, in that state. It was of striped slate and one and half inches in diameter. General Thurston, of Nashville, bought it. Next day I found and figured another in the Canadian collection at Toronto, which came from "West Williams, Lot 20, Concession 18," and was larger, having a diameter of one and seven-eights inches, not reckoning the groove. Otherwise both were spherical, but a little depressed at the perforation. The Ohio specimen had the largest hole.

There is little difference between the North and South shores of Lakes Erie and Ontario in the variety and abundance of articles of striped slate; the country north of Lake Erie being especially rich in bird and bar amulets. New York is also rich in ornamental articles; and Commodore Douglass' table of the geographical distribution of prehistoric Indian remains in our country is not altogether a test of this class of relics.

W. M. BEAUCHAMP.

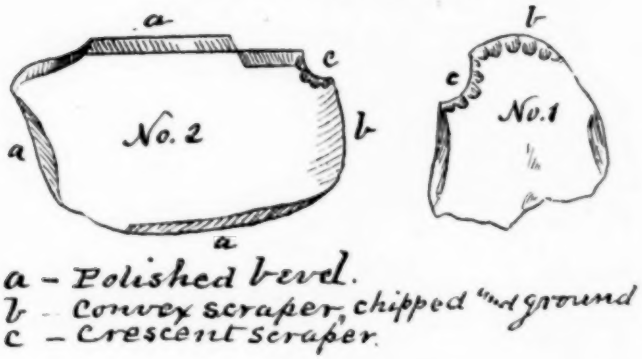
Baldwinsville, N. Y.

Editor of The Antiquarian:

I send you diagrams of some curious implements of the American stone age that are worthy of notice. Fig. 1 is carved from hard, black stone, and is finely polished. It is three-sixteenths of an inch in thickness and just the size of the drawing, and was found in a mound in Michigan. Having no sharp edge, if it was not designed as an ornament, it is difficult to assign its place in the list of prehistoric relics. Fig. 2 is common in our collections here; as is also Fig. 4. We class them with the scrapers—of the "crescent" order. Fig. 4 particularly, with handle attached, would make a very efficient tool with which to fashion a bow or arrow-shaft, Having myself been engaged in manufacturing in which wood working machinery and tools were used in great variety of forms I can appreciate the intelligent design of this primitive spoke-shave.

Fig. 3 represents a class of weapons that are very rare in this locality. I know of only about a dozen specimens, and have one of the same form in my collection that is made of copper, having the cross-bar but no stem. My theory in regard to the special use of this form of arrow point is that they were for shooting fish; the bar preventing the arrow, which had a line attached, from passing through, thereby greatly facilitating its subsequent recovery.

Nos. 2, 3, and 4, drawn in actual size, are about the fourth of an inch thick at the center, flaked, like ordinary arrow points, to an edge all around. The base of each is chipped to an edge suggesting their insertion in handles or shafts. The material of which they are made is dark colored chert, approaching in texture



the true flint. They were found, I think, in Tennessee.

These different forms of concave scrapers indicate that our stone age Indians employed only hard wood for their arrow and spear shafts. If, as some contend, this portion of their weapons was made of cane and reeds, for what purpose did they manufacture these scrapers?

THOMAS HARPER.

Bellevue, Pa.

CHICAGO CRESCENT AND COMBINATION TOOLS.

Editor of The Antiquarian:

In the July number of your spirited periodical I noticed your comments upon the report of Mrs. E. L. Golson, of East Saginaw, Michigan, and of Mr. Jos. Wilson, of Cass county, in our own state, making mention of the finding of flint implements resembling those found by the writer here in Chicago, in which you state it as your opinion that these objects were "emergency implements, made to serve a present purpose and then be thrown away."

I coincided in this belief until lately, when I was forced to change my view upon the matter by finding a perfect specimen of this class that convinced me the conclusion arrived at was incorrect. I enclose a drawing of the implement in question, No. 1, drawn in half of actual size, that clearly shows that this one, at least, was intended for something more than a mere "emergency" tool; and that it was a finely-chipped implement, worked out with care, and considered valuable by its maker.

The locality where it was found is near Highland Park, some twenty-three miles north of the center of the city, along the famous "Sheridan Road," at a point where the road, after crossing a deep chasm or ravine, is cut through a high embankment or hill farther to the north. I often ride along the Sheridan road on my wheel, carefully noting all strange objects in my progress, and discovered that both sides of the deep cut mentioned were bristling with protruding flint fragments and broken and pitted stones, denoting an aboriginal workshop site of large extent. At first I held to the view that this breaking up of the flint was the result of natural causes—heat, frost, storms, etc. —and noticed that these fragments were quartzite and white flint, and not the chert occurring near the present lake beach that was commonly used by the ancient Indians of the Chicago region in manufacturing their tools and weapons. The flint implements found on the Illinois river and north, about the vicinity of Milwaukee, in Wisconsin, are invariably of this white flint, while those found in and around Chicago are generally of chert. I was at a loss to ascertain the source of the white flint until I discovered the refuse of these aboriginal workshops near Highland Park and Winnetka, and then the mystery was explained, for here this material is found in great abundance, and is undoubtedly of glacial origin; the chert of the lake beaches being also glacial deposits, but brought from some other direction, or by other ice waves. The beds of white flint fragments are quite deep—fully five feet—and bespeak great age, and I may add, great population. But how old? That the Chicago white flint arrow-points antedate those made of chert is almost an assurred fact; and those made of white flint are the better implements.

Here is a mystery, and I would fain accept in its explanation the theory of "Lost Aboriginal Arts," as advanced by your learned contributor, Rev. W. M. Beauchamp, in the July number of The Antiquarian. The crescent scraper, No. 1, from the old white flint implement factory mentioned, is both a concave and convex implement, a combination tool, so to speak. Another fine example of this class, No. 2, also figured in half actual size, its flat, lower surface showing that one of its uses was that of a grinder, was found close to the lake beach at the foot of North Fifty-ninth street, or Foster avenue, Argyle Park, in this city. They are both neatly finished, and in places polished—it may be by long use.

I will pass them without further comment, leaving the editor of The Antiquarian to dwell on them in learned discourse.

CHAS. A. DILG.

Chicago, Ill.

(A closer inspection of the concave scrapers reveal the fact that they were skilfully designed for a specific purpose; and that they do bear every appearance of long-continued service.

Mr. Dilg states it as his belief that the white flint surface implements, crescent scrapers included, found about the Milwaukee area and along the Illinois river valley are the product of the ancient workshop he discovered on one of the old lake beaches near Highland Park; and that they are of higher antiquity than the chert implements of the later Indians and of much superior workmanship; all of which is very probable. It is also very probable the white flint was brought there long ago by the early Indians as raw material, from Flint Ridge in Ohio, or some other more or less remote flint outcrop, to be worked up at their leisure, or by their experts, into suitable tools and weapons. Similar refuse heaps of flint chips from old Indian workshops are frequently found throughout the Mississippi valley.—Editor.)

Editor of The Antiquarian:

In the Antiquarian for June, Dr. Thomas Wilson, page 149, figured (Nos. 19 and 20) an arrow-point triangular in section, which he classed as peculiar to Chiriqui, Panama.

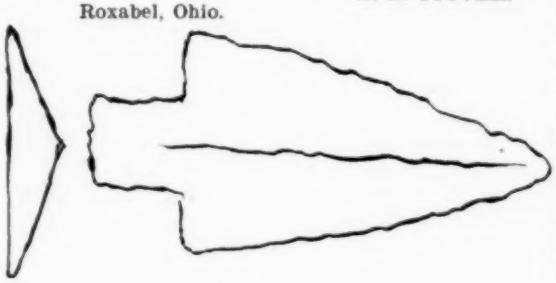
As an amateur collector I have a collection of about one thousand pieces, mostly gathered in this valley, one piece of which I enclose outline drawing, I myself found near Frankfort, Ohio; and from its peculiar shape have been led to call the attention of several advanced collectors to it, but none seem to have seen anything like it before.

Will some advanced archaeologist give, through the columns of The Antiquarian, his theory as to whether this point was made here or brought here from some other country? Have others of the same class been found in this state?

As a source of information, I subscribed for The Antiquarian. Will some one please satisfy my thirst for knowledge on this point?

A. B. COOVER.

Roxabel, Ohio.



(We hope this appeal to our readers will not be in vain.—Editor.)

FIELD NOTES.

In camp, Canon of the Frazier River, near Lytton, B. C.:

July 19, 1897.

To the Readers of The Antiquarian:

The first work of the archaeological section of the Jesup North Pacific Coast expedition was at Spence's Bridge, where one burial with all pertaining to it, was secured, as well as photographs of ancient Indian rock paintings and the ruins of the Kikulie House. The paintings are in red on boulders. The Kilkulie House is perhaps the last to be found in all this region.

From Spence's Bridge the ethnological section pushed over the mountains towards the Bella Coola country with pack train, while the archaeological section began work at Kamloops. At Kamloops ancient burials on the hills, in the valley and of Christian Indians were examined. The bones, with all art objects, were secured, as well as photographs showing the locations and positions of bodies

From Kamloop our section moved to Lytton, where we are now located and enjoying successful results for our work, having forwarded 148 photographic negatives and 55 boxes of specimens to the Museum of Natural History since June 2nd.

Our work at Kamloop and here was upon Indian reserves and was not allowed to progress until they were satisfied that we were working for educational purposes, when at once every facility was granted to us and we found the Indians not only careful and conscientious workmen, but also kind friends.

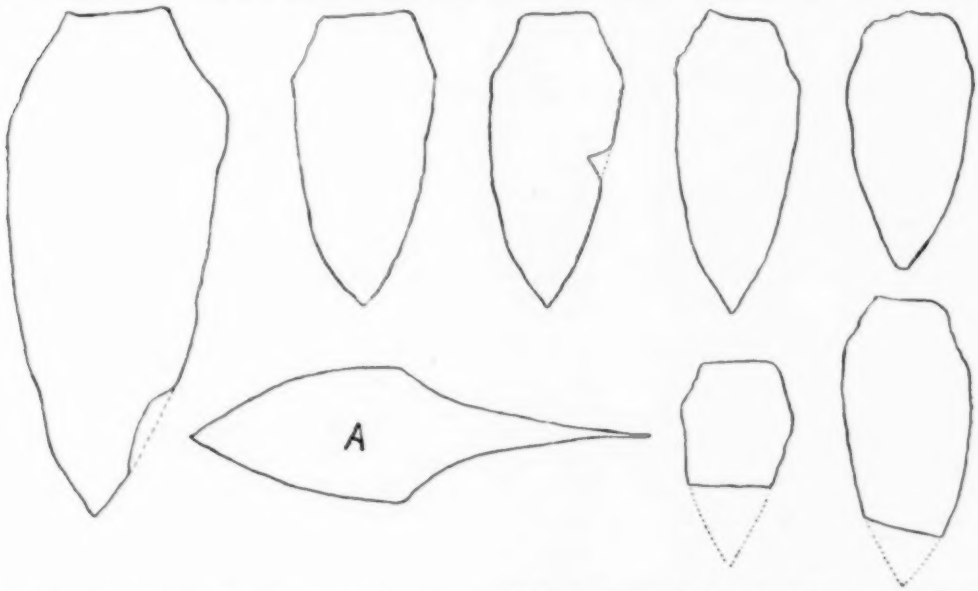
The climate here is delightful. Snow-capped mountains are to be seen in several directions. The sun is burning hot, but the air being clear and cool makes the day pleasant for work and the night cool for sleep. Every prospect is favorable for a successful result to our first year's expedition.

HARLAN I. SMITH.

A TOURIST FINED IN ARIZONA UNDER THE NEW LAW AGAINST VANDALISM.

Flagstaff, Arizona.—Vandalism in Arizona has grown to such an extent that the authorities have at last begun to realize that a vigorous policy of suppression is necessary in order to preserve the nobler monuments of a past civilization that were once so plentiful in this territory. In this county the first step in this direction was taken yesterday, when John O'Toole, an Eastern tourist, was arrested upon a warrant charging him with the wanton destruction of Aztec ruins, near Walnut Canyon. He has been camping out in the canyon for a week or more, and was caught in the act of demolishing some of the ancient cave dwellings there. District Attorney E. S. Clark issued the warrant, and it was served by Deputy Sheriff Fairchilds.

When examined before Justice Wilcox the prisoner was found to have in his possession a valuable collection of relics found in the cave dwellings which he had destroyed. The entire collection was confiscated by the court and will be turned over to the United States government. Under the law passed by the last legislature O'Toole might have been severely punished; but as this was the first case tried under the new law and the prisoner's first offence, he received a severe reprimand and was discharged from custody. Future offenders will not be dealt with so lightly, for the authorities of this county, at least, are determined to do all they can to preserve the few fine ruins still remaining. Twenty years ago there were hundreds of these ruins, untouched by man, where now there are scarcely a score of them in a good state of preservation.



CACHE OF CHIPPED FLINTS IN OSWEGO, TIOGA COUNTY, N. Y.

Editor of The Antiquarian:

A few days ago, while on a trip down the river after relics, I found a cache of seven chipped implements which had been plowed out a few days before, and fortunately for me, had not been noticed by the plowman.

The man said he had plowed the field about two inches deeper than it had ever been plowed before, and this must have been the cause of their coming to the surface. The field is about one and one-half miles below Owego, and borders on the Susquehanna river. It contains about six acres, and is sheltered on the north and west by hills; on the east, across the river, is another ridge of very high hills, which makes it an ideal place for a camp. The seven specimens were found together—the six smaller ones on top of the furrow and the larger one half buried. The plow had struck one of the smaller ones and the larger one and knocked a small piece out of each. They are all alike, of black or gray flint, and of the same general shape and finish.

An excavation eight feet square by two feet deep failed to disclose any more, but exposed a fireplace with a pile of flakes by the side of it, which flakes were of the same material as the seven specimens, and were evidently accumulated in the process of making them. The field shows it was used a long time as a dwelling place; fragments of pottery, heaps of shells, broken pestles, flakes, net sinkers, hammerstones and arrows are plentiful; celts, spears and grooved pebbles are also quite numerous. But one perfect mortar has been found here.

It is not uncommon to get from twenty-five to fifty perfect arrow-points, one to three celts and as many spear points at a visit.

I have in my possession a very interesting chipped flint specimen, which was found on this field a number of years ago. It is seven inches long and is made of blue-gray flint, very nicely finished and is entirely unlike anything else ever found here (to my knowledge). I call it a dagger.

A. F. BARROTT.

Owego, N. Y.